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Trade.

EXPORTS.

to Bombay and large quantities are sent to Madras. Hides are cured at Ambur near Madras before they are offered for sale in the Madras market. In Dhárwár the price of a sheep's hide is 1s. 6d. (12 *as.*), of a goat's hide 1s. 9d. (14 *as.*), of a bullock's and cow's hide 4s. to 6s. (Rs. 2-3), and of a buffalo's hide 6s. to 8s. (Rs. 3-4). Horns are sold at £23 to £38 the ton (Rs. 3-5 the *man*). During the last twenty-five years there has been a great increase in the import of Bombay mill made and European yarn, cotton and woollen cloth, penknives, scissors, needles, thread, kerosine-oil, lamps, wax candles, stationery, watches, clocks, boots and shoes, glassware, matches, and intoxicating drinks.

Crafts.

The chief crafts and industries are the ginning pressing and spinning of cotton, the weaving of cotton and silk goods, the weaving of carpets and printed floor-cloths or *járams*, the making of caps, the weaving of blankets, the working in gold, silver, copper, brass, iron, tin, stone, earth, wood, and leather, and the making of molasses, sugar, glass bangles, oil, redpowder, and ink. Three crafts have entirely or almost entirely died out, the making of saltpetre, earth-salt, and paper.

GINNING.

One¹ of the chief industries of the district is the ginning of cotton, that is the separating cotton wool from cotton seed. Though the practice is greatly neglected, cotton should be dried before it is ginned. If it is not dried the fibre is stained or otherwise harmed. To dry the cotton it should be spread in the sun and often turned so that every part of it, especially the seed, may be thoroughly dried. Cotton cannot be properly ginned in wet or even in damp weather; a short smart shower unless followed by a steady dry wind will stop cotton ginning for days. Each landholder is careful to put on one side part of his best cotton for home spinning. This is ginned separately with much more care than what is meant for sale. The quantity set apart for home spinning depends on the number of women in the household and the leisure they have for working the spinning machine. For home spinning the staple is so well cleaned that not a single seed can be found in a dozen pounds. Three machines are used for ginning cotton; the ginning wheel or *charka*, the foot-roller or *hattigudda*, and the saw-gin. Of these machines the ginning wheel and the foot-roller are used for Kumta or local cotton only. Except in outlying parts on the borders of Madras and Maisur the ginning wheel or *charka* is very little used in Dhárwár.² It turns out more work than the foot-roller, but does not clean the cotton so well. The foot-roller is a rude primitive machine. Its chief parts are the *tevuntigi*, that is the three-legged stool on which the ginner sits, worth 6d. (4 *as.*); the *am-kul* or flat stone about one foot by six inches and two inches thick worth 3d. (2 *as.*); the *pavuntigis* or the two wooden soles for placing under the feet when turning the roller worth 1½d. (1 *a.*); and the *kuda* or iron roller about one foot long and tapering from about half an inch in the middle to a point at the ends. The foot-roller is worked only

¹ From Walton's Dhárwár Cotton in 1877.

² A detailed description of the *charka* is given in the Belgaum Statistical Account.

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by women and children. In using the foot-roller the seed cotton is laid in the sun, frequently turned, and when well dried is sharply beaten with a thin bamboo called *shedi* that it may be as loose as possible for ginning. When a heap of cotton is ready the ginner sits on her three-legged stool. She sets the stone on the ground before her, and, on the stone, lays the iron roller whose ends stand about three inches beyond the sides of the stone. On each end of the roller she sets one of the wooden soles. She leans forward still sitting but partly balancing herself on her feet which she rests on the wooden soles at the ends of the roller. She takes a handful of seed cotton in her right hand and pressing with her feet on the wooden soles moves the roller back and forward on the stone. As the roller moves she drops seed cotton under it and the pressure of the roller on the seed cotton separates the wool from the seed. The seed comes out in front and the wool comes out behind. As the wool comes out the ginner keeps pulling it under her stool with her left hand. Ginners are sometimes paid in kind and sometimes in money. When they are paid in money, the day's earnings range from 3*d.* to 6*d.* (2-4 *as.*). The wages are in proportion to the work done. If cotton owners wish the cotton to be free from seed and dirt for local spinning, the ginner is paid by the amount of seed and dirt she takes out; if the cotton is for export, the ginner is paid by the weight of clean cotton. If honestly worked the foot-roller cleans local cotton better than any other machine. It is the only machine that separates the seed without harming the fibre. At the same time the process is very slow. Only forty-eight pounds of seed cotton are ginned in a day. This slowness is a very serious evil as the local cotton cannot be ginned in time to reach Bombay before the rains, and loses much of its value by being kept for months in damp dirty storehouses. So important an element is the ginning in the preparation of the local cotton that when labour is cheap, the area under local cotton rises, and when labour is dear the area under local cotton falls. American cotton can be ginned by the saw-gin only.¹ Besides some steam gins, which have lately been started in some of the leading centres of the local cotton trade and of which details are given later on, more than a thousand hand-worked saw gins are scattered over the district. In dry weather an eighteen saw-gin in proper order cleans about an hundredweight of seed cotton in an hour. But like the foot-roller, a short sharp shower of rain, unless followed by a steady dry wind often stops saw-ginning for days. Though the saw gin is suited only for American cotton, it is often used to gin the local or Kunta staple; this practice is especially common when the local cotton has been dulled or soiled by rain or has been beaten down on the ground. With the foot-roller it is impossible to make damp and dirty local cotton look well, so the holder passes it through a saw gin, which freshens it and brightens it, and also gives the dealer the chance of passing it as saw-ginned American. Saw gins were brought into India as early as 1828. In 1828 one of two Whitney saw-gins sent by the Court of Directors to

¹ The saw-gin is described in the Belgaum Statistical Account.

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the Bombay Government was forwarded to Dhárwár for trial. Under skilled European control and care the saw-gins at first seemed to work well. At this time the only cotton grown was the local cotton, and, after considerable experience, Dr. Lush, the superintendent of experiments, came to the conclusion that the failures in working the saw-gins were due not to carelessness but to the fact that the saw-gin is not suited to the local cotton. In 1833 Dr. Lush condemned the American Whitney gins. Much time had been lost by assuming that, because the machine did well in America, it must do well in India; a gin was wanted to do for India what the Whitney gin had done for America. On this the Court of Directors offered a £100 (Rs. 1000) prize for the gin best suited to clean Indian cotton. No satisfactory results followed this offer. The introduction of American seed cotton in 1842 gave a fresh importance to saw-gins. The local foot-roller could not separate the New Orleans seed from the fibre. Mr. Shaw, the Collector of Dhárwár, was satisfied that American cotton would never be popular until a simple portable gin was introduced. In 1844, with some difficulty, five saw-gins were procured which cleaned 300 to 350 pounds of seed cotton a day. Still the annoyance of carrying their cotton long distances to a gin-house prevented many from growing American cotton. On Mr. Shaw's application Government allowed small gin houses to be started in different places; and on the request of Mr. Mercer the American planter, twenty-four *charkás* or ginning-wheels were brought from Broach. In the same year a proposal was made to make saw-gins in Dhárwár with materials to be supplied by the Court of Directors. This was the origin of the cotton factory which was established at Kusvugal. Accordingly, in 1845, an indent was sent for 1000 saws, 1200 graters, and 1025 zinc washers. In 1845 twelve saw-gins were at work, of which seven were in the hands of private persons and five were in the hands of Government. The demand was still in excess of the supply; if twenty more saw-gins were available all would be busy. In June 1845 Mr. T. W. Channing, one of the American planters of Kusvugal, expressed the opinion that if a saw-gin could be made cheap enough for the ordinary landholder it would come into general use. In the same letter he obtained leave to make two twenty-five saw-gins at an estimated cost of £19 16s. (Rs. 198). The actual cost proved as low as £14 14s. (Rs. 147), a notable saving from £35 (Rs. 350) the ruling price of an American gin of the same capacity. In October 1846, Captain, afterwards Sir G., Wingate, then superintendent of the revenue survey, had a trial between the new gin and an American gin of the same capacity, and found that the new gin beat the American by twenty-five per cent. Mr. Mercer wrote to Government that as the demand for gins would increase with the spread of American cotton he would require the help of a good European mechanic to make and repair gins. Instead of sending a mechanic the Court of Directors sent 500 saws as the other parts of the gins could be made in India. In 1846 Mr. Channing recommended that Sheffield saws should alone be used as they lasted much longer than American saws. At this time local cotton as well as American was saw-ginned. Mr. Channing calculated that the cost of roll-ginning 500 pounds of local seed cotton was 2s. (Re. 1), while a good twenty saw-gin would gin 840

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pounds in a day at a cost of 2s. 3d. (Rs. 1½) including oil and repairs to belts. At these rates after paying all repairing charges the owner would save £9 4s. 11½d. (Rs. 92½) each season, the saw-gin would pay for itself in two seasons, and would remain in good order if proper care was taken of it. He noticed that the cotton-growers of Hulgur in Bankápur had clubbed together to buy a saw-gin. Mr. Shaw, who had returned to Dhárwár as Collector, wrote to the Revenue Commissioner, recommending that the gins in the district should be transferred to private owners and that one hundred more gins should be made. He had applications from Gadag dealers to buy twelve of the Government gins at £17 (Rs. 170) a gin. Government approved, and in 1847 the Court of Directors made arrangement for sending 5000 Sheffield saws. At this time in Bengal a £50 (Rs. 500) prize was awarded to a Mr. Mather's gin. This machine was tried in Dhárwár, but, though it cost as much as £19 6s. (Rs. 193), it was found not nearly so effective as Mr. Frost's Dhárwár factory gin which cost £1 10s. (Rs. 15). In September 1847 the Court of Directors wrote to the Bombay Government, that, in consequence of the Manchester spinners' and weavers' approval of the saw-ginned Dhárwár cotton, they were sending saws enough to make 200 saw-gins of twenty-five saws each. In 1848, the Court of Directors sent 2600 saws to Dhárwár, and all the machinery of the cotton factory was removed from Kusvugal to Dhárwár. In 1849 twenty-nine saw-gins belonged to Government, five belonged to private persons, and about thirty were being made at the Government factory. By the end of 1849 many of the Government gins had been passed to private persons, sixty-two gins were worked by private persons, and only eight by Government. By this time many of the early gins had become useless, and they were being rapidly replaced by new gins made at the Dhárwár factory. It was believed that what the Dhárwár cotton dealers wanted was an effective, small, and cheap gin, and both in England and in India efforts were made to construct such a machine. On the model of a large gin made by Mr. Frost the engineer of the Dhárwár factory, which had been lent to the Manchester Commercial Association by the East India Company, a small machine was made which is known as the Manchester cottage gin. Several of these cottage gins of different designs were subjected to a public trial, at which the East India Company was represented by Dr. Forbes Royle. The Court of Directors ordered 200 gins of the pattern that Dr. Forbes Royle had approved, and a small consignment of them arrived in Bombay in 1849. Seven of these were sent to Dhárwár. They were not very successful when worked in villages, and Mr. Frost improved on the plan by making a number of seven saw-gins, which he sold at £4 (Rs. 40) a gin. At this time the factory issued gins each of seven to twenty-five saws worth £4 to £22 10s. (Rs. 40-225). Complaints in England that cotton was being cut by the saw-gin raised a discussion as to the rate at which a saw-gin should be driven. Mr. Channing, one of the planters who had considerable experience in the Bombay Karnátak, held that a gin driven at 180 to 190 steady revolutions the minute, would separate the fibre from the seed with as little injury as if it had been done carefully by hand, but that if the speed were either increased or lessened, the cotton would be injured

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as its steady roll would be disturbed. Shortly before this, an Egyptian cotton ginning wheel or *charka* had been sent by Government to Dhárwár; it was set up at the Dhárwár factory, and tried by Messrs. Blount and Frost of the cotton department. Both these officers reported that the Egyptian wheel did not possess a single advantage over the Indian wheel gin and was inferior to it in several respects, the cost was eight times as great, it wanted a strong trained man to work while the native wheel was worked by a woman, and it was fixed while the native wheel was movable. With all these disadvantages the Egyptian wheel did not turn out more work than the Dhárwár wheel. In 1850 the total sale of gins from the Dhárwár factory had reached 144 of which thirty-six had been bought for the neighbouring districts. In 1852-53, 184 saw-gins were at work, and by the end of 1854 the number had risen to 298. In 1854 Mr. Brice, of Messrs. Brice and Company, proposed to take over the Dhárwár factory. In 1855 Mr. Frost resigned, and in May of the same year Dr. Forbes the civil surgeon of Dhárwár for a time took charge of the factory. Many farmers and dealers complained to the new superintendent that they had been supplied with bad gins and had no means of repairing them. Dr. Forbes considered these complaints well founded. On his recommendation Government determined to withdraw all defective machinery and replace it with good saw-gins, on terms more favourable to the landholders and dealers. Much damage had been done to the gins by careless handling. The gins had been taken from place to place by labourers who were entirely paid by the amount of cotton they turned out, and the labourers were not long in finding that a gin whose parts were loose and whose saws were worn passed more cotton than a gin in good repair. The existing gins were too delicate for the rough handling they had received. Dr. Forbes tried to invent a simple lasting and strong machine. Even his gins were not strong enough; but some made in England in iron frames answered better. In 1855-56 fifty gins were issued from the Government factory, some of which were sent to take the place of the condemned gins. Mr. Brice also bought some cotton gins from the Government factory and again made an offer to take up the whole establishment; but Government preferred to keep the factory in their own hands. It was determined that Dr. Forbes should continue to manage the experiments, which now consisted almost solely of providing and repairing machinery. In 1856-57, 123 saw-gins were issued from the Government factory. By this time Messrs. Brice and Company had started cotton agencies at Bankápur, Gadag, Narigal, Navalgund, Ránebennur, and Ron, where they had employed a large number of people in foot-rolling, as their gin houses were not ready. This season Dr. Forbes tried his new ten saw-gins and found them work steadily without damaging the staple. He also made twenty-six wheels or *charkas* for ginning local cotton, but they required too much skill and care and never came into use. Dr. Forbes wished to engage twenty-five boys chosen from the families of village carpenters and blacksmiths and train them to be skilled workmen. Many of the village workmen did not know the use of a screw-nail or a bolt and always injured and often ruined a gin when they tried to repair it. Government held that so long as

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mechanics freely offered their services for employment Dr. Forbes' scheme of training apprentices was unnecessary. In 1857-58, 130 gins were issued, of which seventeen were sent to replace condemned gins. This replacing of old gins by new gins was managed without loss to Government, as it was found that the prices charged for the new gins covered all expenses. By this time gins were scattered all over the district, and it was found very difficult to repair gins fifty to ninety miles from the factory. If a gin was damaged it could be repaired only at the factory, and the owner had to move his gin to the factory at a great cost of money and time. At Dr. Forbes' suggestion a branch factory for repairing gins was established at Karajgi a sub-divisional town about fifty miles south-east of Dhárwár, under Mr. Courpalais, who had been trained as an apprentice by Messrs. Blount and Frost. The factory then employed ninety hands at a monthly cost of £120 (Rs. 1200), and it had become a school for carpenters, smiths, wood and metal turners, and general outfitters. At the end of 1859 the Bombay Government sent Dr. Forbes to England, with the models he had prepared to arrange for the construction of 600 cast-iron gins. In 1859-60, fifty-six new gins were issued from the factory; and about 600 were at work, of which one-half were improved gins and the other half required constant repairs. Dr. Forbes' own gins had been at work for a long time and required frequent inspection. The owners went on working a gin after something had gone wrong until either the gin was broken or the cotton ruined. The system of paying the labourers by the outturn, irrespective of quality, was more general than ever. The labourers had to turn out a certain weight of cotton for a day's work, and, as soon as this was performed, the day's labour was over and they were free to work for other employers. The ginners had come to know that by removing screws and loosening bolts they could let seed and dirt run through and thus increase the weight of cotton. In consequence of the injury that was being done to the good name of Dhárwár-American cotton, Dr. Forbes persuaded the people of Karajgi and Gadag to subscribe 12s. (Rs. 6) a gin and he undertook with the proceeds to keep their gins in repair. In 1860 Dr. Forbes showed a machine for ginning local cotton to a committee of the Bombay Chamber of Commerce. It was made on the principles of the Gujarát wheel gin or *charka*, was worked by a boy, and ginned 430 pounds of seed cotton in twelve hours. At the same time Dr. Forbes produced a large machine which was called the power-gin wheel or *charka*. It was worked by two men and a boy who fed it with cotton, and it ginned 1000 pounds of seed cotton in a day. Neither of these machines came into use as Dr. Forbes thought the machinery too delicate to stand the rough work to which they would be exposed. In 1860-61, forty-two gins were issued, raising the total issue of gins from the Dhárwár factory to 884. Some enterprising workmen who had been trained in the factory had to make and sell gins, and, by the end of 1862, the number of gins at work in the district had risen to 1000. The issue of the private gins was a mistake as they were so ill-made that they did more harm to the cotton than the gins formerly condemned by Dr. Forbes. In 1863, 282 gins and in 1864 181 gins were issued from the factory. At the factory

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the highest price charged for the largest gin was £40 (Rs. 400); but the demand was so great and money was so plentiful that after leaving the factory many gins were bought for £80 (Rs. 800) and some for as much as £100 or £120 (Rs. 1000-Rs. 1200). The demand was so great that many useless gins were sold by private workmen. In 1865, in succession to Major Hassard, Mr. W. Walton was transferred from the forest department to the charge of the factory. The sale of saw-gins for the year was 110. Mr. Walton found the Karajgi and Gadag branches in a bad state. The committees were largely accused of managing them rather in the interests of themselves and their friends than in those of the general body of subscribers. Many of the workmen had left the factories and gone to work on buildings that were being raised by cotton growers and cotton dealers who had grown rich during the American war. The travelling workmen did not repair the gins, but took to other work; and when called on to produce certificates produced false certificates. It was impossible to punish them as village officers and other influential persons were implicated, and they could not be dismissed as there were no other workmen to take their place. In 1865-66 twenty-nine gins were issued. Like Dr. Forbes Mr. Walton when on tour held meetings of gin-owners and proposed to them to build two more branches one at Bankápur and one at Ránebennur, both important cotton trading towns. In 1868-69 a repairing branch was started at Hubli, where up to this time a clever workman had worked a shop at which he repaired gins. In this season 200 gins were repaired. In March 1868 the two new repairing factories began to work. The demand for the use of the factories was greater than could be met, not only on account of the limited number of skilled workmen, but also on account of deficient funds. The gin-owners refused to subscribe a sufficient sum for adequate supervision, and Government were unwilling to bear the expense. During this season a cattle-power machine designed to drive one to four saw-gins of eighteen saws each, was issued from the Dhárwár factory to an influential farmer at Haliyál six miles from Hubli. The machine was driven by three pairs of bullocks, working two gins of eighteen saws each. It was the result of many years' study on the part of Dr. Forbes and other superintendents of the factory and was constructed in England. In the 1868-69 Broach exhibition, this machine and a treadle or *charka* were shown. Both these machines were highly spoken of, but never came into general use in Dhárwár. In 1870-71 during Mr. Walton's absence in England the factory was entrusted to Mr. E. Jones. Mr. Jones devoted his time to the construction of a new rolling gin and the regular work of the central and branch factories fell into disorder. He was succeeded by Mr. Livingston, who had experience of cotton-ginning factories in Gujarát. In 1871-72 Government appointed a committee to consider whether they could withdraw from all connection with the Dhárwár factory. While these inquiries were being made Messrs. W. Nicol & Co., of Bombay, engaged to maintain the gin repairing establishments at Bankápur, Gadag, Hubli, Karajgi, Navalgund, Ránebennur, and Ron, doing away with subscriptions and charging for repairs. Government declined this offer and asked the Revenue Commissioner to suggest how the factories could be best disposed

of. Mr. Havelock the Commissioner was unwilling that the factories should be closed. He thought them an excellent school for training workmen. Mr. Robertson the Collector thought that Government was almost bound to provide means for repairing gins. The gins had been bought and the growth of American cotton had spread to a great extent on the understanding that Government would enable the people to keep the gins in order. After inquiry Government agreed to continue the central factory provided the cost did not exceed £1000 (Rs. 10,000) a year; all branch factories which did not pay were to be closed.

In 1872 Mr W. Bowden was sent by the Secretary of State to conduct experiments to decide which was the best machine for ginning freshly picked Dhárwár-American cotton. The makers of roller gins in England were in favour of roller gins and Dr. Forbes was in favour of saw-gins. Trials were made at Dhárwár both with hand and with cattle power. These trials established one point that the only machine that successfully and economically ginned Dhárwár-American cotton was the saw-gin. Mr. Jones started a small steam-ginning factory with ten of his roller gins at Navalgund. The factory did little work and Mr. Jones shortly afterwards sold the machinery to the Kárwár Company a cotton trading joint stock association. Messrs. Robertson and Brothers worked ten roller gins also by steam in Gadag. It was supposed that machine-ginned local cotton would fetch a sufficiently higher price than foot-rolled local cotton, to cover the expenses of the machinery; but it was found that good foot-rolled local cotton fetched higher prices than machine-ginned local cotton. In 1873, on the suggestion of the Collector Mr. E. P. Robertson, a school of industry for training boys in carpenter's smith's and fitter's work was established in connection with the factory. In May 1875 the central factory was closed as a separate institution and incorporated with the school of industry and in September 1883 the school was closed on account of its expense. In 1873-74 Mr. Jones sold his steam ginning factory to the Kárwár Company who removed it to Hubli. The Kárwár Company tried to work the gins with local cotton, but failed, the manager thought from the want of European supervision. With the object of supplying the trained workmen of Dhárwár with materials required for repairing gins, an auction sale was held at the Dhárwár factory on the 5th of June 1874. No buyers attended. In 1874 the Kárwár Company started a steam-ginning factory at Hubli, but in the same year gave up the idea of cleaning local cotton with steam gins. In 1877 the Kárwár Company started another steam-ginning factory at Gadag. The Hubli steam factory was worked by a ten-horse power engine with ten gins of forty saws each, and the Gadag steam factory was worked by a twenty-horse power engine with twenty gins of forty saws each. Since 1881 when the Kárwár Company failed, the steam factories owned by the Kárwár Company at Hubli and Gadag have been worked by Messrs. Framji and Company. In 1882 the whole of the old saw-gins in these steam factories were replaced by twenty-six double roller Platts' Macarthy gins, eight being at Hubli and eighteen at Gadag. With these new gins the steam factories at present (1884) gin local or Kumta cotton. At present (1884) the branch factories

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